Cited reference 3

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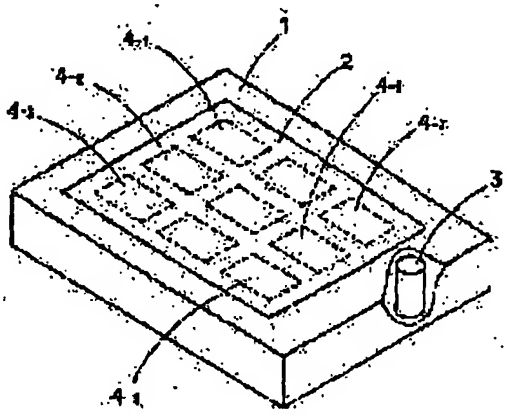
(72)Inventor : YONEZAWA TATSUSHI

(54) TOUCH TYPE INPUT DEVICE, PORTABLE ELECTRONIC EQUIPMENT, REMOTE CONTROL DEVICE AND KEY INPUT DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To surely transmit an operating feeling to an operator in a key operation without troubling those around.
SOLUTION: In an input equipment having a plurality of touch switches 4-1, 4-2...4-9 formed on a display panel, a vibration generator 3 is provided within a case body 1. When any one of the touch switches 4-1, 4-2...4-9 is operated, the vibration generator 3 is vibrated for a short time in replay to it, and this vibration is transmitted to this touch switch through the case body 1 and a display panel 2 and also transmitted to the operating finger to give the operating feeling thereto.



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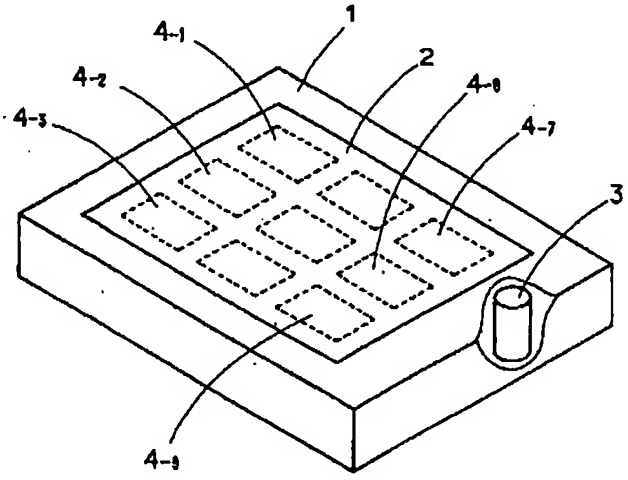
(54)【発明の名称】　タッチ式入力装置、携帯電子機器、リモコン装置及びキー入力装置

(57)【要約】

【課題】　周囲に迷惑をかけることなく、キー操作された場合に、確実に操作感を操作者に伝える。

【解決手段】　表示パネル２上に形成される複数のタッチスイッチ４-１、４-２、……、４-９を有する入力機器において、ケース体１内に振動発生器３を備え、タッチスイッチ４-１、４-２、……、４-９のいずれかが操作されると、これに応答して振動発生器３が短時間振動し、この振動がケース体１、表示パネル２を介して、そのタッチスイッチに伝えられ、操作している指にもその振動が伝えられ、操作感が与えられる。



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【特許請求の範囲】

【請求項１】タッチされることによってオンする複数のタッチスイッチと、これらのタッチスイッチのいずれかの操作に応答して振動を発生する振動発生器とを備えたことを特徴とするタッチ式入力装置。

【請求項２】前記タッチされるものが操作棒を介してなされるものである請求項１記載のタッチ式入力装置。

【請求項３】前記タッチスイッチの操作が許可されたものであるか否かを判別する手段と、この判別結果に応じ、前記振動発生器の振動態様を異ならせるようにしたことを特徴とする請求項１または請求項２記載のタッチ式入力装置。

【請求項４】請求項１、請求項２または請求項３記載のタッチ式入力装置を備えた携帯電子機器。

【請求項５】前記請求項１、請求項２または請求項３記載のタッチ式入力装置を備えたことを特徴とするリモコン装置。

【請求項６】複数のキースイッチと、これらのキースイッチのいずれかが操作されたときに、そのキースイッチの操作が許可されたものであるか否かを判別する手段と、この判別手段で操作が許可されていないものであると判別された時に、振動する振動発生器とを備えたことを特徴とするキー入力装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】この発明は、タッチ式入力装置、キー入力装置及びそれらを備えた携帯機器、リモコン装置に関する。

【０００２】

【従来の技術】従来、パソコン、携帯用端末、携帯電話、カーナビ、リモコン等の電子機器には、シート状またはゴム状の複数のスイッチ、透明導電体、静電容量式のタッチ式入力装置を備え、種々の情報を入力している。この種の入力装置のスイッチは押ボタンスイッチや板バネスイッチ等と相違して、操作してもクリック感が少ないか、あるいは全くなく、接触しても押したかどうか分かりにくく、これを確認するために、操作に応答して音や光を出したり、表示を行うようにしている。

【０００３】

【発明が解決しようとする課題】上記した従来の確認手法のうち、表示は場合によって見にくいし、音や光によると、音では耳の悪い人に伝わりにくいし、光だと目の悪い人に伝わりにくい。また、周囲に操作音や光が伝わり、迷惑をかける恐れがあるという問題があった。

【０００４】また、複数のスイッチのうち、操作を誤ると誤動作、危険動作を生じることとなり、これを避けるために許可されないスイッチについて、操作不可を警告するための表示を行うことがあるが、表示を見過ごし、誤って操作されることがよくある。この発明は上記問題

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ずに、確実に操作感を伝える入力装置を提供することを目的としている。

【０００５】また、操作が許可されないスイッチが操作された場合、確実にその旨を操作者に伝える入力装置を提供することを他の目的とている。

【０００６】

【課題を解決するための手段】この出願の明細書の特許請求の範囲の請求項１に係るタッチ入力装置は、タッチされることによってオンする複数のタッチスイッチと、これらのタッチスイッチのいずれかの操作に応答して振動を発生する振動発生器とを特徴的に備えている。

【０００７】このタッチ式入力装置では、いずれかのタッチスイッチがタッチされ、オンされると、これに応じて振動発生器が振動を発生し、指に伝える。操作者は指への振動を感じ、操作感を得ることができる。また、請求項６に係るキー入力装置は、複数のキースイッチと、これらのキースイッチのいずれかが操作されたときに、そのキースイッチの操作が許可されたものであるか否かを判別する手段と、この判別手段で操作が許可されていないものであると判別された時に、振動する振動発生器とを特徴的に備えている。

【０００８】このキー入力装置では、いずれかのキースイッチが操作され、オンされると、そのキースイッチの操作が許可されたものであるか否か判別され、許可されていないものであると判別されると、振動発生器が振動し、操作者に体感的に誤操作を伝える。

【０００９】

【発明の実施の形態】以下、実施の形態により、この発明をさらに詳細に説明する。図１は、この発明の一実施形態入力機器の外観を示す斜視図である。この実施形態入力機器は、ケース体１の表面に配置される表示パネル２と、ケース体１内に配置される振動発生器３とを備えている。表示パネル２の表面には、透明導体、その上を覆う透明シート等で形成されるタッチスイッチ4_{-1}、4_{-2}、……、4_{-9}を備えている。このタッチスイッチ4_{-1}、4_{-2}、……、4_{-9}の１つを操作、つまり指か操作棒でタッチすると、対応するスイッチオン信号がケース体１内に収容される電子回路に取込まれ、そのキーに対応した処理を実行する。

【００１０】図２は、上記実施形態入力機器の回路構成を示すブロック図である。この実施形態入力機器は電子回路的に複数のタッチスイッチ4_{-1}、4_{-2}、……、4_{-9}を有するキー入力部４と、このキー入力部４のタッチスイッチの操作信号を個別に受け、所望の処理を実行するＣＰＵ１１と、振動を発生すると、その振動をキー入力部４に伝える振動発生器３と、ＣＰＵ１１からの指令を受け、振動発生器３を駆動する駆動回路１２と、ＣＰＵ１１からのデータを表示する表示パネル２とを備えている。

部１１のタッチスイッチ4_{-1}、4_{-2}、……、4_{-9}のいずれかが操作されると、そのオン信号がＣＰＵ１１に取込まれ、ＣＰＵ１１はそれに応答して指令を駆動回路１２に与える。駆動回路１２は、この指令を受けて短時間だけ振動発生器３を駆動し、振動発生器３は、その短時間に振動を発生する。発生した振動は、ケース体１、表示パネル２等を介して直接、間接に操作されたタッチスイッチに伝えられ、操作している指はその振動を受け、触感を得る。振動発生器３、表示パネル２、タッチスイッチ4_{-1}、4_{-2}、……、指の関係をイメージ的に示すと、図３に示すものとなる。図３の（ａ）は指によるものを、図３の（ｂ）はタッチ棒による操作の場合をそれぞれ示している。　上記した実施形態入力機器は、卓上用のパソコンの入力部に適用できるが、図４に示すような表示部２２と入力部２４が折り畳み式の一方と他方に形成される携帯型パソコンや電子手帳にも適用できる。また、図５に示すように、キー入力部３４を有し、テレビ受像機等を遠隔操作するリモコン用にも適用できる。さらに、また携帯電話器やカーナビゲーション機器にも適用できる。これら各機器は、キースイッチを操作すると、内蔵する振動発生器の振動によって操作感、タッチ感を得るものである。

【００１２】次に、この発明の他に実施形態入力機器について説明する。ここで説明する実施形態入力機器は、キースイッチを操作すると、それが正しい操作の場合に、第１のモードの操作を受けて、接触感、タッチ感が得られるとともに、たまたま操作されたキースイッチが誤操作であり、許可されない操作の場合には、第２のモードの振動を、そのキースイッチに代え、誤操作であった旨を体感的に伝え、警告とするものである。第１のモードの振動とは、例えば図６の（ａ）に示すような単発的なものであり、第２のモードの振動とは、例えば図６の（ｂ）のように２回に分けられてなされる振動である。両者は、図６の（ａ）と（ｂ）の相違のみならず、互いに他の異なる振動態様であってもよい。回路構成は、図２に示すものと同様である。

【００１３】次に、この実施形態入力機器の処理動作を図７に示すフロー図を参照して説明する。最初に、キータッチがなされると（ステップＳＴ１）、そのスイッチのオン信号がＣＰＵ１１に読み込まれ（ステップＳＴ２）、ＣＰＵ１１ではそのキースイッチの操作が操作シーケンス上、あるいは機器の動作の安全確保上、許可されるものであるか否かが判定される（ステップＳＴ３）。操作が問題とならないキースイッチの操作であると判別された場合には、上記した第１モードで振動発生器３を駆動する（ステップＳＴ４）。この振動により操作者はタッチ感、操作感を得るとともに、ＣＰＵ１１はそのキー操作に対応する処理を実行し（ステップＳＴ５）、全処理が終了とする（ステップＳＴ６）まで、ＳＴ３の判別で、操作されたキーが許可されないものであると判別された場合には、第１のモードとは異なる態様の第２モードで振動発生器３を駆動する（ステップＳＴ７）。この場合、ＣＰＵ１１はキー操作に対応した処理を実行せず、ステップＳＴ１に戻る。当然、異なる態様の振動が操作者の指に伝えられるので、操作者は自分が誤操作したことを知ることができる。

【００１４】ここで説明した実施形態入力機器は、許可されたキースイッチと、許可されないキースイッチにつき、それぞれ異なる態様の振動を伝え、両者を区別するようにしているが、許可されたキースイッチの操作に対しては振動を与えず、許可されないキースイッチの操作の場合にのみ振動発生器を駆動して、そのキースイッチに振動を与え、誤操作を警告するようにしてもよい。

【００１５】また、携帯電話等、呼出しに対して振動発生器を動作させて、その呼を携帯者に伝える物では、その携帯者呼出し用の振動発生器をキーの操作感を得るための誤操作を報知するための振動発生器に兼用すると、コストを上昇させずに機能をアップできる。次に、上記実施形態入力機器で採用される振動発生器の一例を説明する。図８に、その振動発生器の外観斜視図、図９に部分的に切欠いて示す内部構造図、図１０にその断面図を示す。

【００１６】この振動発生器は、内空部４２を有する円筒状の筒体である筐体４１と、筐体４１の内空部４２の一方端に固着される固定永久磁石４３と、内空部４２の他方端に固着される固定永久磁石４４と、内空部４２のこれら固定永久磁石４３、４４間で移動可能に収納される可動永久磁石４５と、筐体４１の外周に巻回される駆動コイル４６と、所定の周期でパルス信号を発生するパルス電源４７と、このパルス電源４７からのパルス信号を印加して駆動コイル４６に通電するための端子４８とを備えている。固定永久磁石４３と固定永久磁石４４は、それぞれ異なる磁力の大きさのものを用いており、ここでは永久磁石４３の磁力を大きくしている。このように、磁力を異ならせておくことにより、可動永久磁石４５が駆動コイル４６の非通電時に、一方側に位置するため初期動作がスムーズとなる。筐体４１は、駆動コイル４６を巻回する外周部４１ｃと、駆動コイル４６を巻回しない外周部４１ａ、４１ｂとを有し、外周部４１ｃは外周部４１ａ、４１ｂよりも径が小さく設定されている。このようにすることによって、駆動コイル４６を外周部４１ｃに巻回した状態で、外周面を外周部４１ａ、４１ｂとほぼ同じとすることができ、外径の小さい小型の振動発生器を得ることができる。なお、外周部４１ａは外周部４１ｂより軸方向で短く形成され、外周部４１ａと４１ｂの間に外周部４１ｃが形成されている。

【００１７】また、筐体４１は、内空部４２の径に対し、固定永久磁石４３及び固定永久磁石４４を固着する

３、４４の位置決めを行うとともに、固定永久磁石４３、４４の径を大きくして長さを小さくしている。このようにすることにより、結果として長さの小さい振動発生器を得ることができる。

【００１８】この振動発生器では、駆動コイル４６にパルス通電することにより生じる電磁コイル４６の磁気力と可動永久磁石４５、固定永久磁石４３、４４の磁気エネルギーの変化に対し、その磁気エネルギーがバランスするように、可動永久磁石４５が筐体４１内を移動する。つまり、可動永久磁石４５から固定永久磁石４３、４４とは非接触で往復移動することにより、振動を生じるものである。

【００１９】もっとも、上記各実施形態入力機器に使用する振動発生器は、図８～図１０で示したものに限ることなく、電気的な指令を受けて駆動する小型の振動発生器であれば、いかなるものを使用してもよい。なお、上記各実施形態で、タッチスイッチはシート状のものを説明したが、この発明は、ボタン式のスイッチで構成されるキーボードに、振動発生器を設けることにより、いずれかのボタンスイッチが操作された場合に、操作に応答して振動発生器を動作させ、ボタンスイッチ自身のクリック感に加えて、振動発生器から伝わる振動によって、さらに操作感を向上させる場合にも適用できる。

【００２０】

【発明の効果】特許請求の範囲の請求項１に係る発明によれば、タッチスイッチのいずれかが操作されると、その操作に応答して振動発生器が振動し、そのキーに振動を伝えるものであるから、振動によって操作者は操作感を周囲に迷惑を与えることなく、得ることができる。また、１個の振動発生器で複数のキースイッチの操作感を出すことができ、さらにそれ自体操作感のないローコストスイッチを用いても、それらに操作感が得られるようになるので、結果としてコストの低廉な入力機器を実現できる。

【００２１】また、請求項３に係る発明によれば、操作されたキースイッチが操作が許可されたキースイッチであるか、許可されないキースイッチであるかを判別し、

許可される場合と許可されない場合とを別の態様で振動発生し、そのキースイッチに伝えるものであるから、１個の振動発生器で操作者は各キースイッチの操作感を得るとともに、許可されない操作を行った場合に異なるモードの振動により、直ちに誤操作を知ることができる。

【００２２】また、請求項６に係る発明によれば、操作されたキースイッチが操作を許可されたキースイッチであるか、許可されないキースイッチであるかを判別し、許可されない場合にのみ振動発生器を振動させ、その振動をそのキースイッチに伝えるものであるから操作者は直ちに誤操作を知ることができる。

【図面の簡単な説明】

【図１】この発明の一実施形態入力機器の外観を示す斜視図である。

【図２】同実施形態入力機器の回路構成を示すブロック図である。

【図３】同実施形態入力機器のキータッチの場合の操作イメージを説明する図である。

【図４】同実施形態入力機器を適用する携帯電子機器の外観を示す斜視図である。

【図５】同実施形態入力機器を適用するリモコン機器の外観を示す斜視図である。

【図６】この発明の他の実施形態入力機器の振動モードを説明するための波形図である。

【図７】図６の他の実施形態入力機器の処理動作を説明するためのフロー図である。

【図８】上記各実施形態入力機器で採用される振動発生器の一例を示す外観斜視図である。

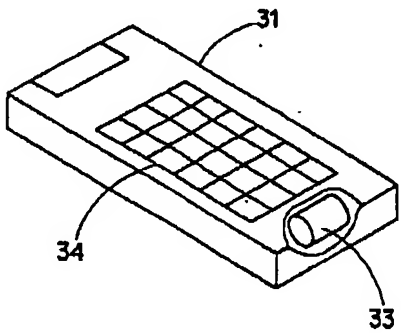
【図９】同振動発生器の一部分を切欠いて示す内部構造図である。

【図１０】同振動発生器の断面図である。

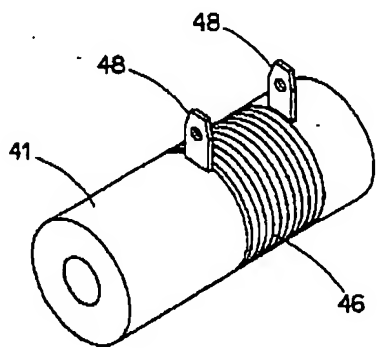
【符号の説明】

1	ケース体
2	表示パネル
3	振動発生器
4-1、4-2、……、4-9	タッチスイッチ

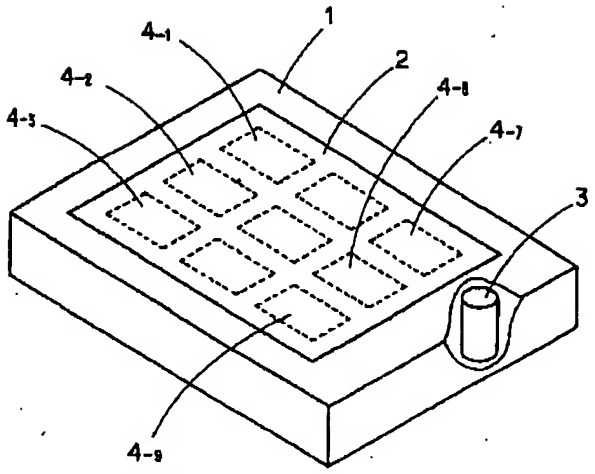
【図５】



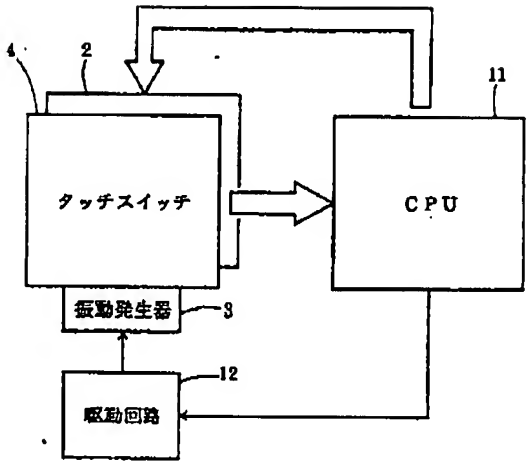
【図８】



【図1】



【図2】



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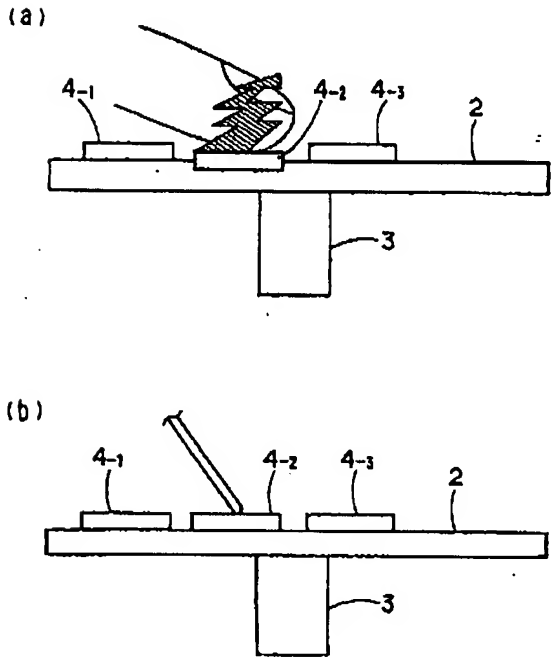
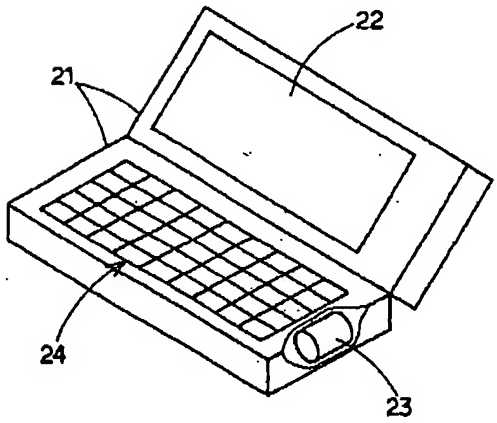
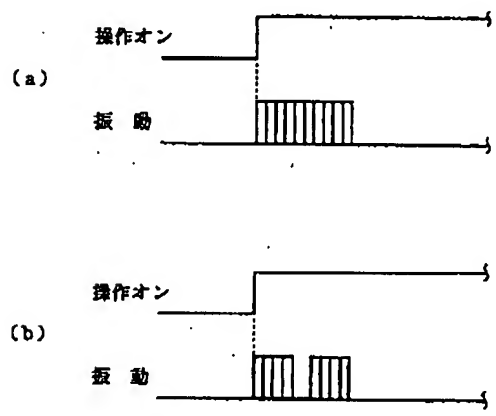


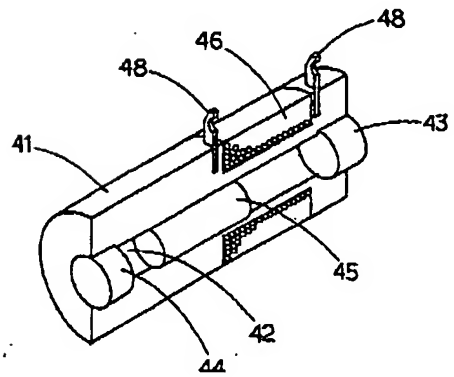
【図4】



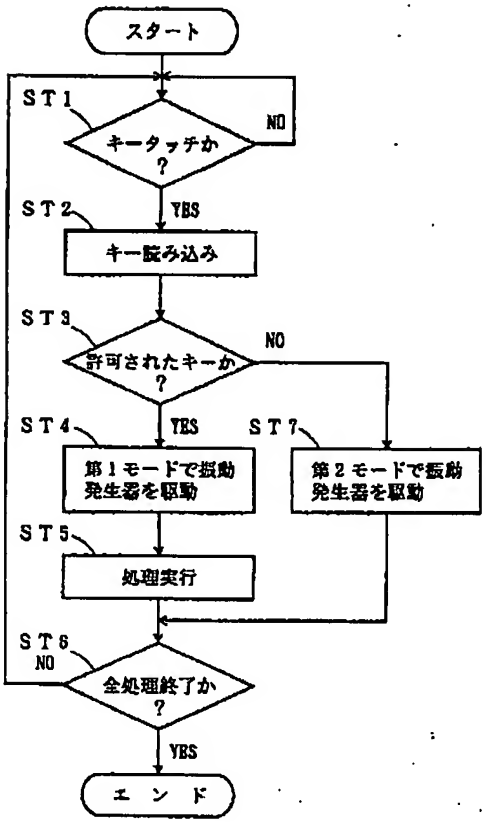
【図6】



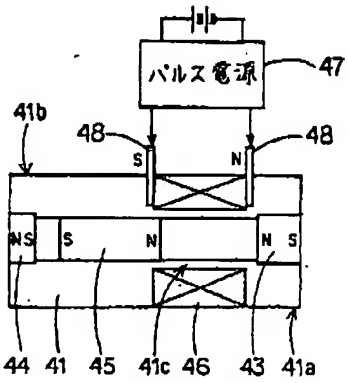
【図9】



【図７】


スタート
ST1
キータッチか？
NO
YES
ST2
キー読み込み
ST3
許可されたキーか？
NO
YES
ST4
第１モードで振動発生器を駆動
ST7
第２モードで振動発生器を駆動
ST5
処理実行
ST6
NO
全処理終了か？
YES
エ　ン　ド

【図１０】


パルス電源
47
41b
48
48
S
N
N
S
S
N
N
S
44
41
45
41c
46
43
41a

PATENT ABSTRACTS OF JAPAN

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(22)Date of filing : **27.11.1997**

(71)Applicant : **OMRON CORP**

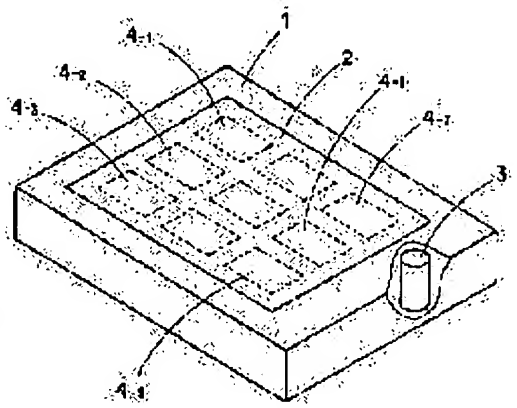
(72)Inventor : **YONEZAWA TATSUSHI**

(54) TOUCH TYPE INPUT DEVICE, PORTABLE ELECTRONIC EQUIPMENT, REMOTE CONTROL DEVICE AND KEY INPUT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To surely transmit an operating feeling to an operator in a key operation without troubling those around.

SOLUTION: In an input equipment having a plurality of touch switches 4-1, 4-2...4-9 formed on a display panel, a vibration generator 3 is provided within a case body 1. When any one of the touch switches 4-1, 4-2...4-9 is operated, the vibration generator 3 is vibrated for a short time in replay to it, and this vibration is transmitted to this touch switch through the case body 1 and a display panel 2 and also transmitted to the operating finger to give the operating feeling thereto.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

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3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention relates to a pocket device and a remote control unit equipped with a touch type input unit, key input equipment, and them.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Conventionally, electronic equipment, such as a personal computer, a portable remote terminal, a cellular phone, car navigation, and remote control, was equipped with two or more switches of the shape of the shape of a sheet, and rubber, the transparence conductor, and the electrostatic-capacity-type touch type input unit, and various information is inputted into it. It is different from a pushdown switch, a flat-spring switch, etc., and even if it operates it, there is few feeling of a click or it does not have them, it is unclear in whether it pushed, even if contacted, and it is [the switch of this kind of input device answers actuation, and] made to give off a sound and light or to display, in order to check this.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view showing the appearance of the 1 operation gestalt input device of this invention.
[Drawing 2] It is the block diagram showing the circuitry of this operation gestalt input device.
[Drawing 3] It is drawing explaining the actuation image in the case of the key touch of this operation gestalt input device.
[Drawing 4] It is the perspective view showing the appearance of the pocket electronic equipment which applies this operation gestalt input device.
[Drawing 5] It is the perspective view showing the appearance of the remote control device which applies this operation gestalt input device.
[Drawing 6] It is a wave form chart for explaining the oscillation mode of other operation gestalt input devices of this invention.
[Drawing 7] It is a flow Fig. for explaining processing actuation of other operation gestalt input devices of drawing 6 .
[Drawing 8] It is the appearance perspective view showing an example of the tremulor adopted with each above-mentioned operation gestalt input device.
[Drawing 9] It is a notching ******** internal structure Fig. in some of these tremulor.
[Drawing 10] It is the sectional view of this tremulor.
[Description of Notations]
1 Case Object
2 Display Panel
3 Tremulor
4-1, 4-2, ..., 4-9 Touch switch

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] When a display is hard to see, the pile of it is carried out to a person with a bad lug to a sound by the case at propagation according to a sound or light and it is light among the above-mentioned conventional check technique, it is a pile to propagation in a person with a bad eye. Moreover, there was a problem that a possibility that an actuation sound and light may make you propagation and trouble was in a perimeter.
[0004] Moreover, although the display for warning of an actuation failure may be performed about the switch which is not permitted in order to produce malfunction and risk actuation and to avoid this, if actuation is mistaken among two or more switches, a display is overlooked and it is sometimes often operated accidentally. This invention is made paying attention to the above-mentioned trouble, and it aims at offering the input unit which tells a feeling of actuation certainly, without making trouble to a perimeter.
[0005] moreover, the thing for which the input unit which tells an operator that certainly is offered when the switch with which actuation is not permitted is operated -- other purposes -- **** .

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] According to invention concerning claim 1 of a claim, if either of the touch switches is operated, since the actuation is answered, the tremulor vibrates and vibration is told to the key, an operator can get a feeling of actuation by vibration, without giving trouble to a perimeter. Moreover, the feeling of actuation of two or more key switches with one tremulor can be taken out, and since a feeling of actuation comes to be obtained by them even if it uses the low-cost switch which does not have a feeling of actuation in itself further, the ****** input device of cost is realizable as a result. [0021] Moreover, [whether according to invention concerning claim 3, the operated key switch is a key switch with which actuation was permitted, and] Whether it is the key switch which is not permitted carries out oscillating generating of the case where distinguish and a permission is not granted with the case where a permission is granted, in another mode. Since it tells the key switch, while an operator gets the feeling of actuation of each key switch with one tremulor, an operation mistake can be immediately known by vibration of the mode which is different when actuation which is not permitted is performed. [0022] Moreover, whether according to invention concerning claim 6, the operated key switch is a key switch to which actuation was permitted, or it is the key switch which is not permitted distinguish, and since the tremulor is vibrated and the vibration is told to the key switch only when a permission is not granted, an operator can know an operation mistake immediately.

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MEANS

[Means for Solving the Problem] The touch input device concerning claim 1 of the claim of the specification of this application is equipped with two or more touch switches turned on by being touched, and the tremulor which answers one actuation of these touch switches, and generates vibration characteristic.
[0007] In this touch type input device, if it is touched and one of touch switches is turned on, according to this, the tremulor will generate vibration and will tell a finger. An operator senses the vibration to a finger and can get a feeling of actuation. Moreover, the key input equipment concerning claim 6 is equipped with the vibrating tremulor characteristic, when two or more key switches or these key switches are operated, and it is distinguished that it is what actuation is not permitted with a means to distinguish whether actuation of that key switch is permitted, and this distinction means.
[0008] With this key input equipment, one of key switches is operated, if it is distinguished that it is what it is distinguished whether actuation of that key switch is permitted and is not permitted if turned on, the tremulor will vibrate and an operation mistake will be told to an operator in somesthesis.
[0009]
[Embodiment of the Invention] Hereafter, the gestalt of operation explains this invention to a detail further. Drawing 1 is the perspective view showing the appearance of the 1 operation gestalt input device of this invention. This operation gestalt input device is equipped with the display panel 2 arranged on the front face of the case object 1, and the tremulor 3 arranged in the case object 1. the front face of a display panel 2 -- transparence -- it has a conductor, the touch switch 4-1 formed with a wrap transparence sheet etc. in a it top, 4-2, ..., 4-9. It is incorporated in this touch switch 4-1, 4-2, ..., the electronic circuitry where a corresponding switch-on signal will be held in the case object 1 if one of the 4-9 is touched with actuation, i.e., a finger, and a joy stick, and processing corresponding to that key is performed.
[0010] Drawing 2 is the block diagram showing the circuitry of the above-mentioned operation gestalt input device. The touch switch 4-1 of the plurality [input device / this / operation gestalt] in electronic circuitry, 4-2, ..., the key input section 4 that has 4-9, CPU11 which receives the actuation signal of the touch switch of this key input section 4 according to an individual, and performs desired processing, If vibration is generated, it has the drive circuit 12 which drives the tremulor 3, and the display panel 2 which displays the data from CPU11 in response to the tremulor 3 which tells the vibration to the key input section 4, and the command from CPU11.
[0011] In this operation gestalt input device, if the touch switch 4-1 of the key input section 11, 4-2, ..., either of 4-9 are operated, that ON signal is incorporated by CPU11, and CPU11 will answer it and will give a command to the drive circuit 12. The drive circuit 12 drives the tremulor 3 only for a short time in response to this command, and the tremulor 3 generates vibration for that short time. Generated vibration is told to the touch switch operated directly and indirectly through the case object 1 and the display-panel 2 grade, and the finger currently operated receives the vibration and obtains tactile feeling. If the relation of a finger is shown in image, it will become the tremulor 3, a display panel 2, a touch switch 4-1, 4-2, ..., the thing shown in drawing 3 . (b) of drawing 3 shows the case of actuation

according what depends (a) of drawing 3 on a finger to a touch rod, respectively. Although the above-mentioned operation gestalt input device is applicable to the input section of the personal computer for tables, it is applicable also to the portable personal computer and electronic notebook which a display 22 and the input section 24 as shown in drawing 4 fold up, and are formed in one side and another side of a formula. Moreover, as shown in drawing 5 , it has the key input section 34 and can apply to the remote control which operates a television set etc. by remote control. Furthermore, it is applicable also to a cellular-phone machine or a car navigation device again. Each [these] device will obtain a feeling of actuation, and a feeling of a touch by vibration of the tremulor to build in, if a key switch is operated.
[0012] Next, an operation gestalt input device is explained besides this invention. While a feeling of contact and a feeling of a touch will be obtained in response to actuation in the 1st mode when it is right actuation if a key switch is operated, when it is the actuation which the key switch operated by chance is an operation mistake, and is not permitted, the operation gestalt input device explained here replaces vibration of the 2nd mode with the key switch, tells in somesthesis the purport which was an operation mistake, and carries out as warning. Vibration of the 1st mode is vibration which vibration of the 2nd mode is divided [single shot] into 2 times as shown in (b) of drawing 6 , and is made as shows (a) of drawing 6 . Both may be oscillating modes from which others differ mutually only not only in (a) of drawing 6 , and the difference of (b). Circuitry is the same as that of what is shown in drawing 2 .
[0013] Next, it explains with reference to the flow Fig. showing processing actuation of this operation gestalt input device in drawing 7 . If a key touch is made by the beginning (step ST 1), the ON signal of the switch will be read into CPU11 (step ST 2), and it will be judged in CPU11 whether actuation of the key switch is what is permitted on an actuation sequence or the security of actuation of a device (step ST 3). When it is distinguished that it is actuation of a key switch in which actuation does not pose a problem, the tremulor 3 is driven in the 1st above-mentioned mode (step ST 4). While an operator gets a feeling of a touch, and a feeling of actuation by this vibration, a step ST 1 is equipped with it at return and the next key stroke until CPU11 performs processing corresponding to that key stroke (step ST 5) and all processings consider it as termination (step ST 6). When it is distinguished that it is what the operated key is not permitted by distinction of a step ST 3, the tremulor 3 is driven in the 2nd mode of a different mode from the 1st mode (step ST 7). In this case, CPU11 does not perform processing corresponding to a key stroke, but returns to a step ST 1. Since vibration of a different mode is naturally told to an operator's finger, an operator can know that he did the operation mistake.
[0014] Although the operation gestalt input device explained here tells vibration of a mode different, respectively about the permitted key switch and the key switch which is not permitted and he is trying to distinguish both, vibration is not given to actuation of the permitted key switch, but, only in actuation of the key switch which is not permitted, the tremulor is driven, vibration is given to the key switch, and an operation mistake may be made warn.
[0015] Moreover, a cellular phone etc. operates the tremulor to a call, and by the object which tells a pocket person the call, if it uses also [tremulor / for reporting the operation mistake for obtaining the feeling of actuation of a key for the tremulor for the pocket person calls], a function can be raised, without raising cost. Next, an example of the tremulor adopted with the above-mentioned operation gestalt input device is explained. The sectional view is partially shown in the appearance perspective view of the tremulor, and drawing 9 at a notching ******** internal structure Fig. and drawing 10 at drawing 8 .
[0016] The case 41 this tremulor of whose is a cylinder-like barrel which has an internal hollow part 42, The stationary magnet 43 of the internal hollow part 42 of a case 41 which fixes at an edge on the other hand, and the stationary magnet 44 which fixes at the another side edge of an internal hollow part 42, These stationary magnets 43 of an internal hollow part 42, and the movable permanent magnet 45 contained movable among 44, It has the drive coil 46 wound around the periphery of a case 41, the pulse power source 47 which generates a pulse signal with a predetermined period, and the terminal 48 for impressing the pulse signal from this pulse power source 47, and energizing to a drive coil 46. The thing of the magnitude of magnetism different, respectively is used for the stationary magnet 43 and the stationary magnet 44, and they enlarge the magnetism of a permanent magnet 43 here. Thus, by

changing magnetism, since the movable permanent magnet 45 is located in one side at the time of un-energizing [of a drive coil 46], it becomes smooth initial operating it. A case 41 has periphery section 41c which winds a drive coil 46, and the periphery sections 41a and 41b which are not winding about a drive coil 46, and, as for periphery section 41c, the path is small set up rather than the periphery sections 41a and 41b. By doing in this way, where a drive coil 46 is wound around periphery section 41c, a peripheral face can be made almost the same as the periphery sections 41a and 41b, and the small tremulor with a small outer diameter can be obtained. In addition, periphery section 41a is short formed by shaft orientations from periphery section 41b, and periphery section 41c is formed among the periphery sections 41a and 41b.

[0017] Moreover, a case 41 enlarges the path of stationary magnets 43 and 44, and makes die length small while it sets up greatly the bore of the both ends of the case 41 which fixes a stationary magnet 43 and a stationary magnet 44 to the path of an internal hollow part 42 and positions stationary magnets 43 and 44. By doing in this way, the tremulor with die length small as a result can be obtained.

[0018] the electromagnetism produced by carrying out pulse energization in a drive coil 46 in this tremulor -- to change of the magnetic force of a coil 46, and the magnetic energy of the movable permanent magnet 45 and stationary magnets 43 and 44, the movable permanent magnet 45 moves in the inside of a case 41 so that that magnetic energy may balance. That is, stationary magnets 43 and 44 produce vibration from the movable permanent magnet 45 by carrying out both-way migration by non-contact.

[0019] But as long as the tremulor used for each above-mentioned operation gestalt input device is small tremulor driven in response to an electric command, without restricting to what was shown by drawing 8 - drawing 10 , what kind of thing may be used for it. In addition, although the touch switch explained the sheet-like thing with each above-mentioned operation gestalt, when one of button switches is operated by forming the tremulor in the keyboard which consists of carbon button-type switches, this invention answers actuation, operates the tremulor, and also when raising a feeling of actuation further, in addition to the own feeling of a click of a button switch, it can be applied by vibration transmitted from the tremulor.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a pocket device and a remote control unit equipped with a touch type input unit, key input equipment, and them.
[0002]
[Description of the Prior Art] Conventionally, electronic equipment, such as a personal computer, a portable remote terminal, a cellular phone, car navigation, and remote control, was equipped with two or more switches of the shape of the shape of a sheet, and rubber, the transparence conductor, and the electrostatic-capacity-type touch type input unit, and various information is inputted into it. It is different from a pushdown switch, a flat-spring switch, etc., and even if it operates it, there is few feeling of a click or it does not have them, it is unclear in whether it pushed, even if contacted, and it is [the switch of this kind of input device answers actuation, and] made to give off a sound and light or to display, in order to check this.
[0003]
[Problem(s) to be Solved by the Invention] When a display is hard to see, the pile of it is carried out to a person with a bad lug to a sound by the case at propagation according to a sound or light and it is light among the above-mentioned conventional check technique, it is a pile to propagation in a person with a bad eye. Moreover, there was a problem that a possibility that an actuation sound and light may make you propagation and trouble was in a perimeter.
[0004] Moreover, although the display for warning of an actuation failure may be performed about the switch which is not permitted in order to produce malfunction and risk actuation and to avoid this, if actuation is mistaken among two or more switches, a display is overlooked and it is sometimes often operated accidentally. This invention is made paying attention to the above-mentioned trouble, and it aims at offering the input unit which tells a feeling of actuation certainly, without making trouble to a perimeter.
[0005] moreover, the thing for which the input unit which tells an operator that certainly is offered when the switch with which actuation is not permitted is operated -- other purposes -- **** .
[0006]
[Means for Solving the Problem] The touch input device concerning claim 1 of the claim of the specification of this application is equipped with two or more touch switches turned on by being touched, and the tremulor which answers one actuation of these touch switches, and generates vibration characteristic.
[0007] In this touch type input device, if it is touched and one of touch switches is turned on, according to this, the tremulor will generate vibration and will tell a finger. An operator senses the vibration to a finger and can get a feeling of actuation. Moreover, the key input equipment concerning claim 6 is equipped with the vibrating tremulor characteristic, when two or more key switches or these key switches are operated, and it is distinguished that it is what actuation is not permitted with a means to distinguish whether actuation of that key switch is permitted, and this distinction means.

[0008] With this key input equipment, one of key switches is operated, if it is distinguished that it is what it is distinguished whether actuation of that key switch is permitted and is not permitted if turned on, the tremulor will vibrate and an operation mistake will be told to an operator in somesthesis.
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[0010] Drawing 2 is the block diagram showing the circuitry of the above-mentioned operation gestalt input device. The touch switch 4-1 of the plurality [input device / this / operation gestalt] in electronic circuitry, 4-2, ..., the key input section 4 that has 4-9, CPU11 which receives the actuation signal of the touch switch of this key input section 4 according to an individual, and performs desired processing, If vibration is generated, it has the drive circuit 12 which drives the tremulor 3, and the display panel 2 which displays the data from CPU11 in response to the tremulor 3 which tells the vibration to the key input section 4, and the command from CPU11.
[0011] In this operation gestalt input device, if the touch switch 4-1 of the key input section 11, 4-2, ..., either of 4-9 are operated, that ON signal is incorporated by CPU11, and CPU11 will answer it and will give a command to the drive circuit 12. The drive circuit 12 drives the tremulor 3 only for a short time in response to this command, and the tremulor 3 generates vibration for that short time. Generated vibration is told to the touch switch operated directly and indirectly through the case object 1 and the display-panel 2 grade, and the finger currently operated receives the vibration and obtains tactile feeling. If the relation of a finger is shown in image, it will become the tremulor 3, a display panel 2, a touch switch 4-1, 4-2, ..., the thing shown in drawing 3 . (b) of drawing 3 shows the case of actuation according what depends (a) of drawing 3 on a finger to a touch rod, respectively. Although the above-mentioned operation gestalt input device is applicable to the input section of the personal computer for tables, it is applicable also to the portable personal computer and electronic notebook which a display 22 and the input section 24 as shown in drawing 4 fold up, and are formed in one side and another side of a formula. Moreover, as shown in drawing 5 , it has the key input section 34 and can apply to the remote control which operates a television set etc. by remote control. Furthermore, it is applicable also to a cellular-phone machine or a car navigation device again. Each [these] device will obtain a feeling of actuation, and a feeling of a touch by vibration of the tremulor to build in, if a key switch is operated.
[0012] Next, an operation gestalt input device is explained besides this invention. While a feeling of contact and a feeling of a touch will be obtained in response to actuation in the 1st mode when it is right actuation if a key switch is operated, when it is the actuation which the key switch operated by chance is an operation mistake, and is not permitted, the operation gestalt input device explained here replaces vibration of the 2nd mode with the key switch, tells in somesthesis the purport which was an operation mistake, and carries out as warning. Vibration of the 1st mode is vibration which vibration of the 2nd mode is divided [single shot] into 2 times as shown in (b) of drawing 6 , and is made as shows (a) of drawing 6 . Both may be oscillating modes from which others differ mutually only not only in (a) of drawing 6 , and the difference of (b). Circuitry is the same as that of what is shown in drawing 2 .
[0013] Next, it explains with reference to the flow Fig. showing processing actuation of this operation gestalt input device in drawing 7 . If a key touch is made by the beginning (step ST 1), the ON signal of the switch will be read into CPU11 (step ST 2), and it will be judged in CPU11 whether actuation of the key switch is what is permitted on an actuation sequence or the security of actuation of a device (step ST 3). When it is distinguished that it is actuation of a key switch in which actuation does not pose a problem, the tremulor 3 is driven in the 1st above-mentioned mode (step ST 4). While an operator gets a

feeling of a touch, and a feeling of actuation by this vibration, a step ST 1 is equipped with it at return and the next key stroke until CPU11 performs processing corresponding to that key stroke (step ST 5) and all processings consider it as termination (step ST 6). When it is distinguished that it is what the operated key is not permitted by distinction of a step ST 3, the tremulor 3 is driven in the 2nd mode of a different mode from the 1st mode (step ST 7). In this case, CPU11 does not perform processing corresponding to a key stroke, but returns to a step ST 1. Since vibration of a different mode is naturally told to an operator's finger, an operator can know that he did the operation mistake.

[0014] Although the operation gestalt input device explained here tells vibration of a mode different, respectively about the permitted key switch and the key switch which is not permitted and he is trying to distinguish both, vibration is not given to actuation of the permitted key switch, but, only in actuation of the key switch which is not permitted, the tremulor is driven, vibration is given to the key switch, and an operation mistake may be made warn.

[0015] Moreover, a cellular phone etc. operates the tremulor to a call, and by the object which tells a pocket person the call, if it uses also [tremulor / for reporting the operation mistake for obtaining the feeling of actuation of a key for the tremulor for the pocket person calls], a function can be raised, without raising cost. Next, an example of the tremulor adopted with the above-mentioned operation gestalt input device is explained. The sectional view is partially shown in the appearance perspective view of the tremulor, and drawing 9 at a notching ******** internal structure Fig. and drawing 10 at drawing 8 .

[0016] The case 41 this tremulor of whose is a cylinder-like barrel which has an internal hollow part 42, The stationary magnet 43 of the internal hollow part 42 of a case 41 which fixes at an edge on the other hand, and the stationary magnet 44 which fixes at the another side edge of an internal hollow part 42, These stationary magnets 43 of an internal hollow part 42, and the movable permanent magnet 45 contained movable among 44, It has the drive coil 46 wound around the periphery of a case 41, the pulse power source 47 which generates a pulse signal with a predetermined period, and the terminal 48 for impressing the pulse signal from this pulse power source 47, and energizing to a drive coil 46. The thing of the magnitude of magnetism different, respectively is used for the stationary magnet 43 and the stationary magnet 44, and they enlarge the magnetism of a permanent magnet 43 here. Thus, by changing magnetism, since the movable permanent magnet 45 is located in one side at the time of un-energizing [of a drive coil 46], it becomes smooth initial operating it. A case 41 has periphery section 41c which winds a drive coil 46, and the periphery sections 41a and 41b which are not winding about a drive coil 46, and, as for periphery section 41c, the path is small set up rather than the periphery sections 41a and 41b. By doing in this way, where a drive coil 46 is wound around periphery section 41c, a peripheral face can be made almost the same as the periphery sections 41a and 41b, and the small tremulor with a small outer diameter can be obtained. In addition, periphery section 41a is short formed by shaft orientations from periphery section 41b, and periphery section 41c is formed among the periphery sections 41a and 41b.

[0017] Moreover, a case 41 enlarges the path of stationary magnets 43 and 44, and makes die length small while it sets up greatly the bore of the both ends of the case 41 which fixes a stationary magnet 43 and a stationary magnet 44 to the path of an internal hollow part 42 and positions stationary magnets 43 and 44. By doing in this way, the tremulor with die length small as a result can be obtained.

[0018] the electromagnetism produced by carrying out pulse energization in a drive coil 46 in this tremulor -- to change of the magnetic force of a coil 46, and the magnetic energy of the movable permanent magnet 45 and stationary magnets 43 and 44, the movable permanent magnet 45 moves in the inside of a case 41 so that that magnetic energy may balance. That is, stationary magnets 43 and 44 produce vibration from the movable permanent magnet 45 by carrying out both-way migration by non-contact.

[0019] But as long as the tremulor used for each above-mentioned operation gestalt input device is small tremulor driven in response to an electric command, without restricting to what was shown by drawing 8 - drawing 10 , what kind of thing may be used for it. In addition, although the touch switch explained the sheet-like thing with each above-mentioned operation gestalt, when one of button switches is operated

by forming the tremulor in the keyboard which consists of carbon button-type switches, this invention answers actuation, operates the tremulor, and also when raising a feeling of actuation further, in addition to the own feeling of a click of a button switch, it can be applied by vibration transmitted from the tremulor.

[0020]

[Effect of the Invention] According to invention concerning claim 1 of a claim, if either of the touch switches is operated, since the actuation is answered, the tremulor vibrates and vibration is told to the key, an operator can get a feeling of actuation by vibration, without giving trouble to a perimeter. Moreover, the feeling of actuation of two or more key switches with one tremulor can be taken out, and since a feeling of actuation comes to be obtained by them even if it uses the low-cost switch which does not have a feeling of actuation in itself further, the ****** input device of cost is realizable as a result.

[0021] Moreover, [whether according to invention concerning claim 3, the operated key switch is a key switch with which actuation was permitted, and] Whether it is the key switch which is not permitted carries out oscillating generating of the case where distinguish and a permission is not granted with the case where a permission is granted, in another mode. Since it tells the key switch, while an operator gets the feeling of actuation of each key switch with one tremulor, an operation mistake can be immediately known by vibration of the mode which is different when actuation which is not permitted is performed.

[0022] Moreover, whether according to invention concerning claim 6, the operated key switch is a key switch to which actuation was permitted, or it is the key switch which is not permitted distinguish, and since the tremulor is vibrated and the vibration is told to the key switch only when a permission is not granted, an operator can know an operation mistake immediately.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The touch type input unit characterized by having two or more touch switches turned on by being touched, and the tremulor which answers one actuation of these touch switches, and generates vibration.
[Claim 2] The touch type input unit according to claim 1 which is that by which said thing touched is made through a joy stick.
[Claim 3] The touch type input unit according to claim 1 or 2 characterized by making it change the oscillating mode of said tremulor with a means to distinguish whether actuation of said touch switch is permitted, according to this distinction result.
[Claim 4] Claim 1, pocket electronic equipment equipped with the touch type input unit according to claim 2 or 3.
[Claim 5] The remote control unit characterized by having said claim 1 and a touch type input unit according to claim 2 or 3.
[Claim 6] Key input equipment characterized by having a means to distinguish whether actuation of that key switch is permitted when two or more key switches or these key switches are operated, and the tremulor which vibrates when it is distinguished that it is what actuation is not permitted with this distinction means.

[Translation done.]

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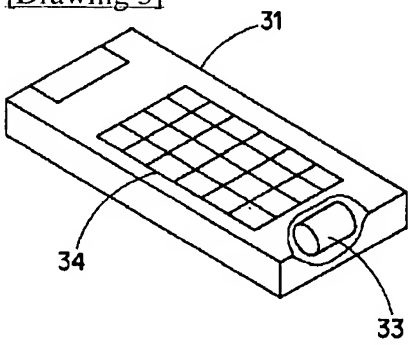
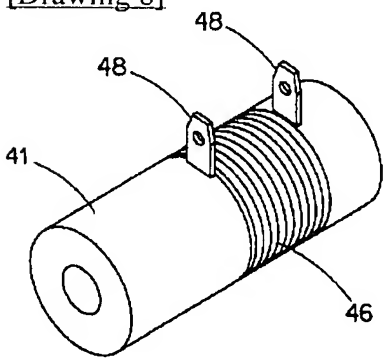
DRAWINGS

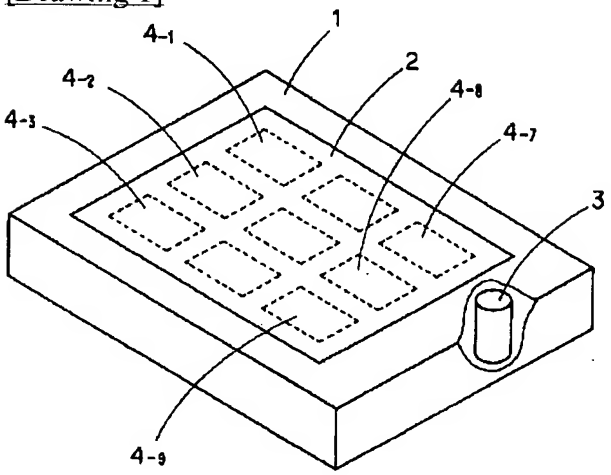
[Drawing 5]



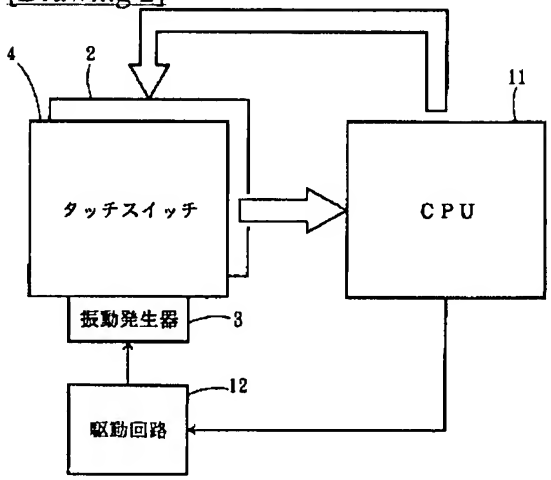
[Drawing 8]



[Drawing 1]

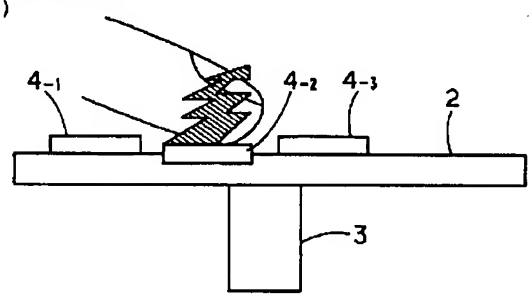


[Drawing 2]

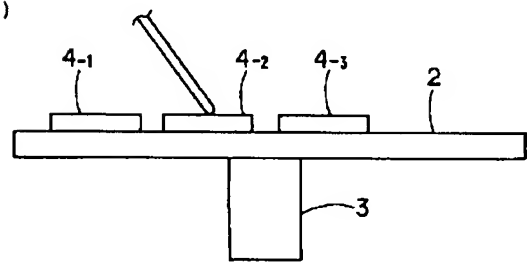


[Drawing 3]

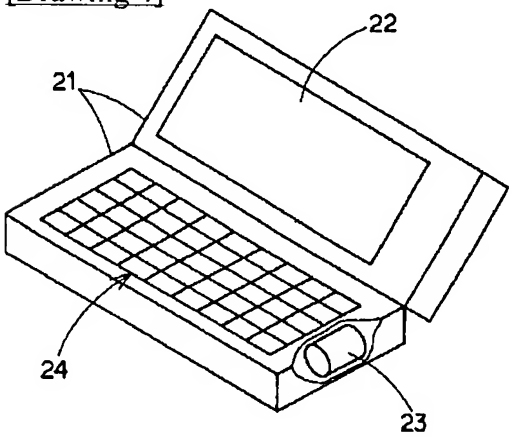
(a)



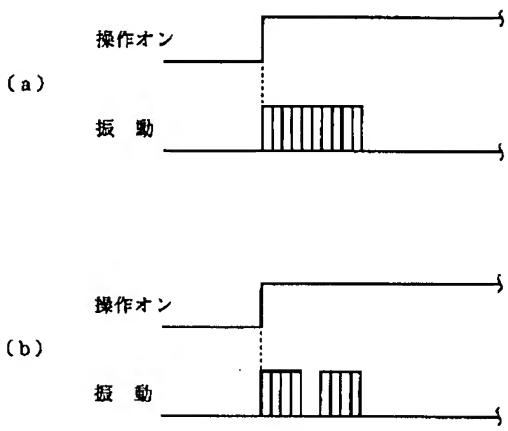
(b)



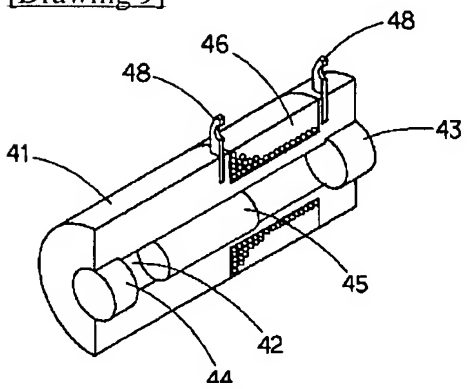
[Drawing 4]



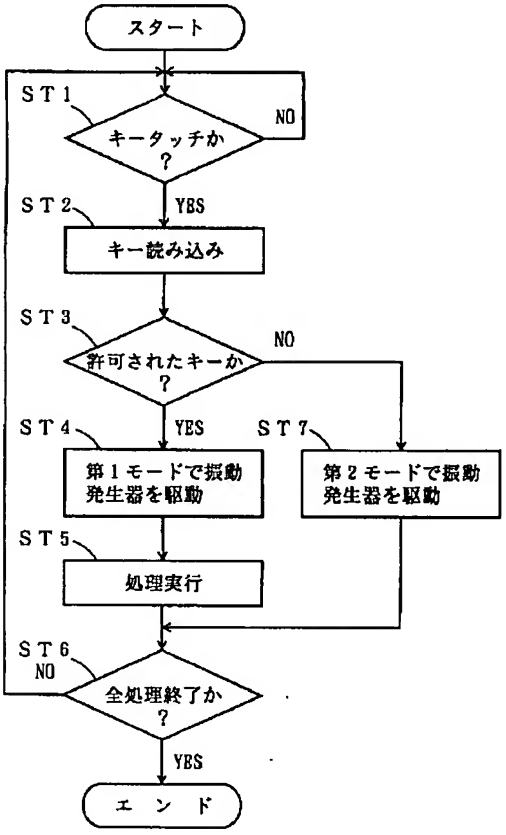
[Drawing 6]



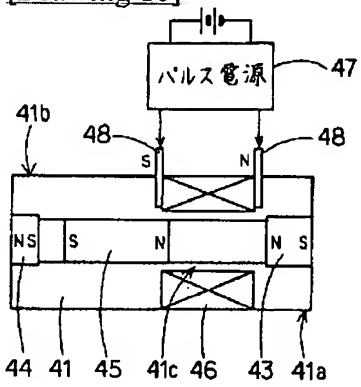
[Drawing 9]



[Drawing 7]



[Drawing 10]



[Translation done.]